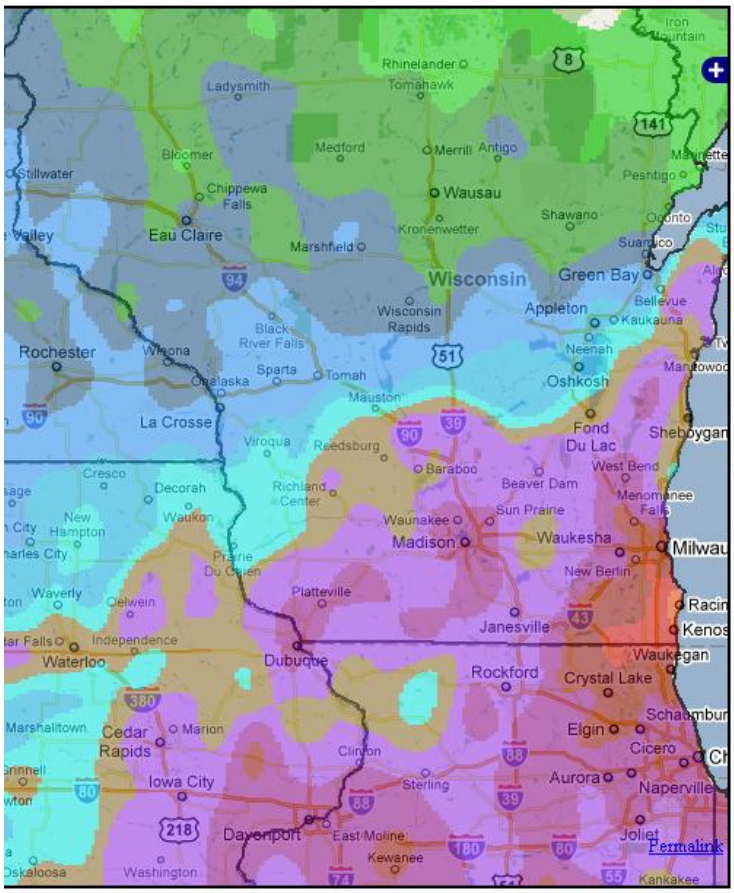
# Top Weather Events in Wisconsin for 2011

(updated 3 pm 12/21 for injuries related to tornadoes and thunderstorm winds)

## February 1-2nd , 2011, Groundhog Blizzard

During the overnight hours of Feb 1 to Feb 2, a powerful low pressure center passing south of Wisconsin produced blizzard conditions across much of southern Wisconsin. Snow associated with the system began in the mid-afternoon hours of Feb 1st in far southern Wisconsin and pushed northward into the state through the evening. Very strong northeast winds gusting to 45 to 60 mph were associated with this storm for an extended period of time. Snow accumulations ranged from 12 to 26 inches! This snow and winds generated massive snow drifts of 6 to 10 feet, and some locations had drifts up to 12 to 15 feet in height! An observer at Pell Lake, Walworth County, had the greatest amount of 26 inches, which ties the state -24-hour snowfall record held by Neillsville in Clark county back on December 27, 1904.

Many locations saw blizzard conditions from early on the evening of Feb 1 through the early morning hours of Feb 2. In addition to the blizzard, several inches of snow fell on Jan 31, with light lake-effect snow in the eastern half of the area through the day on Feb 1. It's possible that some locations did not see a break in snowfall between the evening of Jan 31 and the morning of Feb 2. See 3-day totals in map.



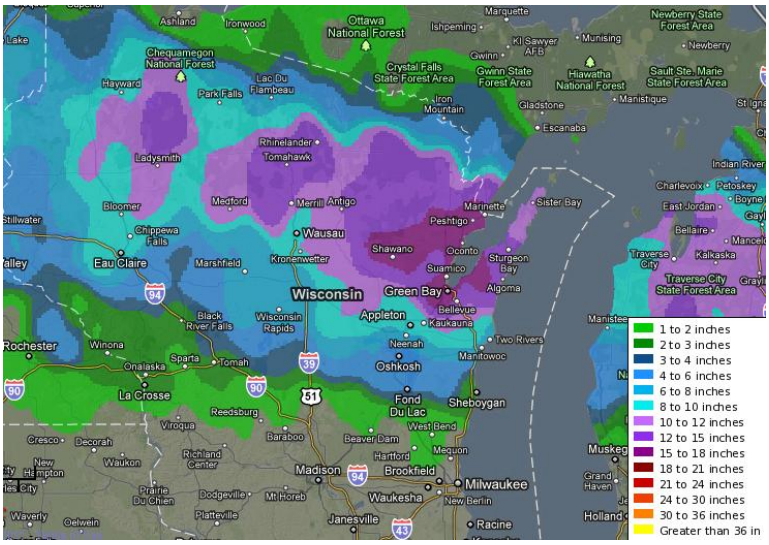

Some roads became impassible due to snow-drifts and were closed – including a stretch of I-94 and I-43 south and southwest of Milwaukee, respectively. In some cases, emergency crews were unable to reach stranded motorists. However, most people heeded early NWS warnings of a potentially paralyzing blizzards and wisely chose not to travel.
http://www.crh.noaa.gov/mkx/?n=020211_blizzard
http://www.crh.noaa.gov/arx/?n=feb0111
http://www.crh.noaa.gov/arx/?n=feb0211

## February 20-21, 2011, Winter Storm Central Wisconsin

A winter storm with heavy snow, including thundersnow, affected a wide swath across northern South Dakota through southern Minnesota through central Wisconsin. Snow accumulations generally ranged from 8 to almost 15 inches. Waupaca had the greatest total of 14.6 inches, with many locations in the 10 to 13 inch range. A mixture of snow, freezing rain and sleet fell across southern Wisconsin. This Feb 20-21st storm was followed by a second round which consisted of an additional 1 to 6 inches for the Feb 21-22nd period.
http://www.crh.noaa.gov/images/mpx/StormReports/20February2011.pdf
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=64383&source=2
http://www.crh.noaa.gov/arx/?n=feb2011

## March 22-23, 2011, Winter Storm Northern & Central Wisconsin

A late-season winter storm produced heavy, wet snow and occasional thundersnow across parts of northern Wisconsin in late March. During the two-day period, many locations reported over a foot of snow. Green Bay officially recorded 17.8 inches. That's the highest snowstorm total in over 120 years of weather records; only two storms produced more snow (29.0" in March 1888 and 23.1" in January 1889). In addition, this storm is the third one this season to produce 10 inches or more of snow in Green Bay, the first time that's ever happened during a winter season. Shawano's storm total was 18.8 inches.




In west-central Wisconsin, 6 to 11 inches of heavy, wet snow were measured. The weight of the snow collapsed the WEAU TV-13 tower (2000 feet tall) near Fairchild (southeast of Eau Claire).

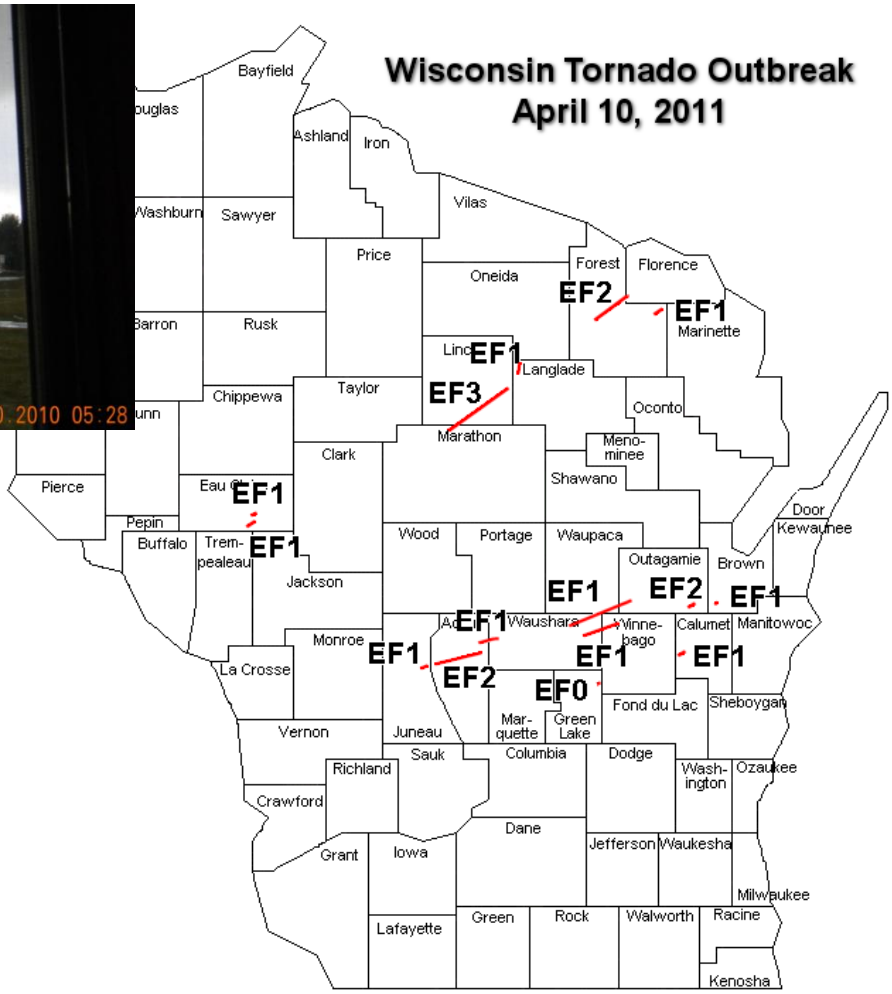
# April 10, 2011, Record-Setting Tornado Outbreak in Central and Northern Wisconsin

April 10, 2011, will go down as the biggest daily April tornado outbreak (in terms of total tornadoes) in Wisconsin history. At least 15 tornadoes, including four strong tornadoes (EF2 or EF3), were documented in portions of mainly rural central and northern Wisconsin. Additionally, April 10, 2011 is the 6th busiest day for Wisconsin for any day of the year. August 18, 2005 is in first place with 27.

The EF3 tornado on April 10, 2011 occurred near Merrill in Lincoln County, with a track of 21.2 miles and an estimated 140 mph winds. There were only 2 people injured with this strong tornado which was the strongest in Wisconsin for 2011. EF2 tornadoes were also documented in Adams County, Forest County, and Outagamie County. Severe storms dumped hail with diameters of 2 to 3 inches in the city of La Crosse which resulted in damage in the millions of dollars.

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=66565&source=2
http://www.crh.noaa.gov/grb/?n=110410_tornadoes
http://www.crh.noaa.gov/arx/?n=apr1011

Picture of the Merrill tornado

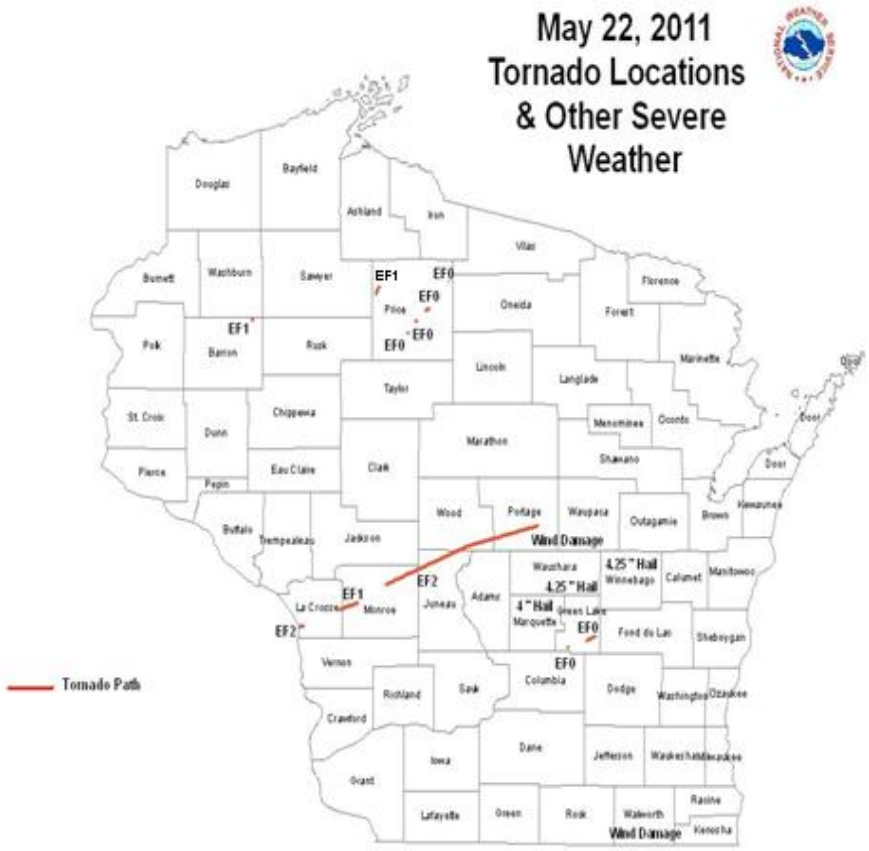


## May 22, 2011, Tornado Outbreak, Wind Storms, and Hail Storms

For the second consecutive month Wisconsin experienced a Top-10 tornado day. The 11 tornadoes on May 22nd is 10th highest number of tornadoes in a day across the state, and the second highest for any day in May.

The tornadoes occurred with discrete supercells across central and northern Wisconsin. One EF2 tornado with 120 mph winds had a track of 64.5 miles across portions of Monroe, Juneau, Wood, and Portage counties. This was the 17th longest tornado track in Wisconsin's recorded history. The city of La Crosse was struck by an EF2 tornado (120 mph winds), which started in southeast Minnesota and had a 2-state path of 16 miles.

Other storms in central and southern Wisconsin produced large hail and damaging downburst winds. Some of the hailstones were on the order of 4 to 4.25 inches in diameter in parts of Waushara, Winnebago, and Marquette County. The southern parts of Walworth and Kenosha County experienced bow echo with thunderstorm straight-line winds gusts to around hurricane-force (74 mph or higher).
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=68624&source=2
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=grb&storyid=68662&source=2
http://www.crh.noaa.gov/arx/?n=may2211
http://www.crh.noaa.gov/dlh/?n=22may2011_tors



## June 21, 2011, 100+ mph Wind Storm and Tornadoes over East-central and Southeast Wisconsin

A powerful line of severe storms, in a shape of a bow, plowed northeast through western Waukesha and southern Washington County with estimated winds of 80 to perhaps 110 mph (max winds in red-hatched area in map below). Downburst winds over 100 mph are rare in Wisconsin. Thousands of trees were uprooted or damaged, and vehicles and buildings were damaged by tree debris. One person injured by airborne tree debris near border of Delafield and Pewaukee. One semi-trailer was blown over on I-94 in Waukesha County. Reported damage was an estimated $280,000.

For a brief moment Doppler radar measured a wind speed of 126 mph about 350 feet above the ground near Dousman as the bow echo accelerated northeast.

Elsewhere in southern Wisconsin on June 21st, two weak EF1 tornadoes affected the county border area between Fond du Lac and Green Lake County. Several farm buildings were damaged and a number of trees were uprooted or pushed over, but no one was injured.
http://www.crh.noaa.gov/mkx/?n=062111_wind_tor

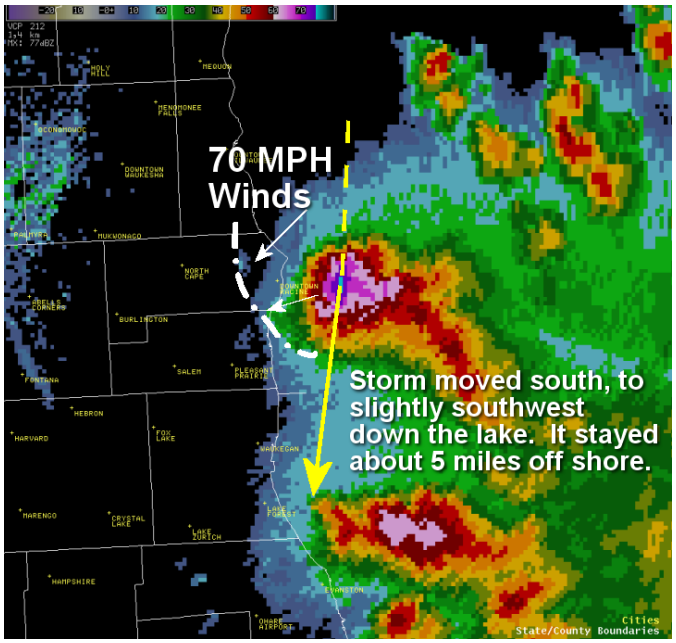
## June 30, 2011, Supercell Event on Lakeshore of Kenosha, Racine, and Milwaukee Counties

A very intense thunderstorm rolled south just off shore of Milwaukee, Racine and Kenosha counties early Thursday evening, bringing damaging winds of 60 to around 80 mph to the lake shore areas of Racine and Kenosha counties, as well as to southeastern Milwaukee County. A gust of 82 mph was measured at the Racine Airport.

Although the storm remained 5 to 10 miles off shore, it did kick out an intense outflow boundary that moved on shore, bringing the damaging winds to the shoreline communities. Numerous trees were uprooted, power-lines were knocked down and roofs had shingle damage. There were reports of felled trees or tree branches damaging homes and mobile homes.

In eastern Kenosha County one person died from injuries when a tree fell on them while on a motorcycle, and one person was injured by flying debris from a damaged shed. There are reports that some people were injured after-the-fact when they accidently touched downed power lines.

The picture below shows the storm's position just before 8 PM. It also shows the path it took and the orientation of the outflow boundary (white.) It never rained over the land areas as the core of the storm was well off-shore.




## July 1, 2011, Severe Weather in Western Wisconsin

A line of severe storms moved rapidly northeastward through western Wisconsin, leaving behind considerable straight-line wind damage to trees and some structures. In Burnett County 140,000 acres of trees were damaged or destroyed, which is estimated to be 1.5 million cords. Damage to public property, like roads and trails, was $1.8 million. Uninsured property damage was estimated at $350,000. The storm injured 39 people. Most injuries were minor.

In Douglas County, an EF2 tornado struck the area southwest of Solon Springs. A house and its outbuildings were destroyed. Several other outbuildings and houses were damaged. Many trees were snapped off or uprooted. Peak winds were estimated at 120 to 130 mph.

Additionally, in Burnett County, about 5 miles east of Hertel, an eleven year old girl was killed while trying to escape the approaching storm. Lightning struck a tree and the tree fell on the girl, killing her. The tree was so large that it took 20 men to remove it.
http://www.crh.noaa.gov/arx/?n=jul0111

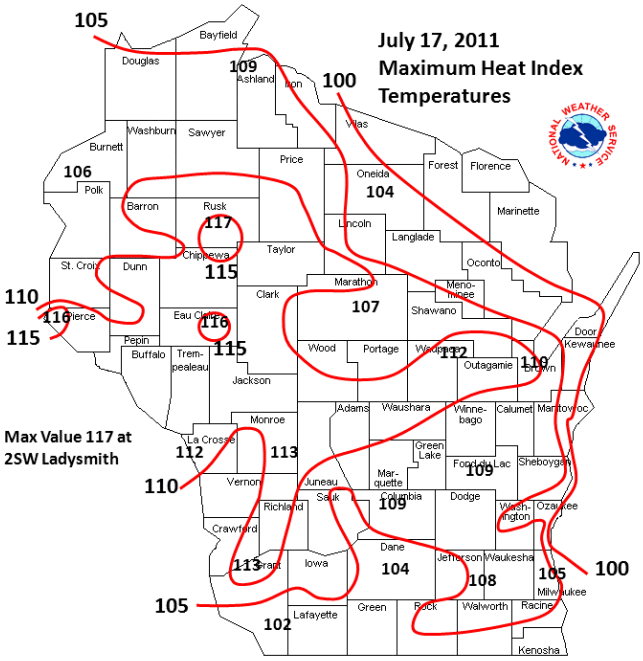
## July 17-21, 2011, Statewide Long-Duration Heat Wave

A long-duration, 4-day heat wave affected the state during the period of July 17-21st with heat index values of 100 to 117. Actual maximum temperatures were generally in the mid to upper 90s, and minimum nighttime temperatures generally ranged from the upper 60s to mid-70s. There were only 5 directly-related fatalities, thanks to a 3-day advance notice by the NWS, and preparedness efforts of state, county, and local officials in conjunction with excellent media coverage. The fatalities were the first directly-related ones in Wisconsin since the 2006 summer. At least 108 people received medical treatment for heat illness. Below is an image of the maximum heat index values for July 17th.

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=71123&source=2

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=arx&storyid=70928&source=2

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=71067&source=2



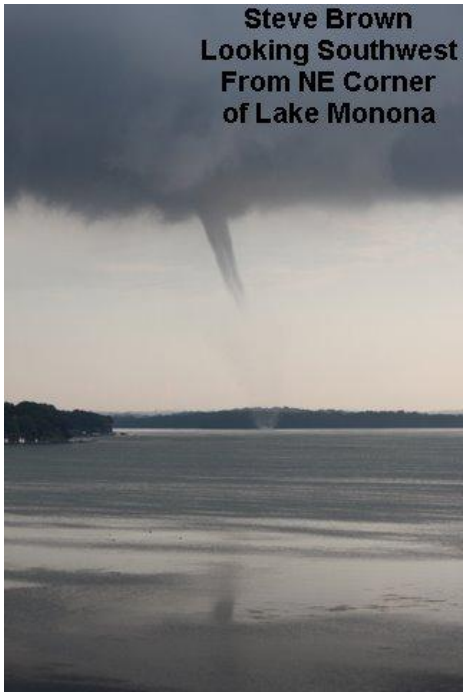

## July 28, 2011, Heavy Rains (10") & Flooding Grant County

Heavy thunderstorms dumped copious amounts of rain across parts of northeast Iowa and extreme southwest Wisconsin overnight July 28th. Over 10 inches of rain was reported from Sinsinawa, WI near the Illinois-Wisconsin border. Parts of Highways 35 and 11 in far southwest Wisconsin were closed to keep people from driving into flood waters in far northwest Illinois.

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=dvn&storyid=71313&source=0

## August 8, 2011, Tornado/Waterspout on Lake Monona in Madison

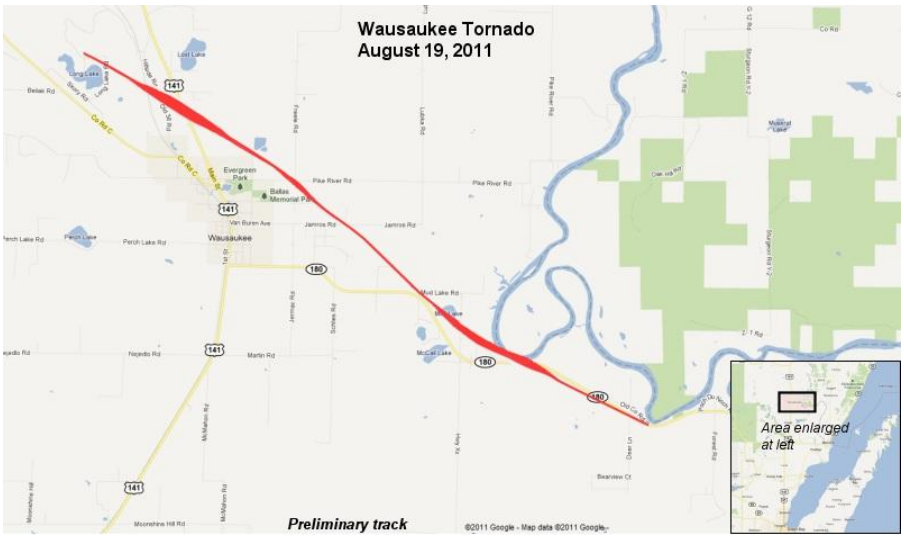
A weak tornado-waterspout (EF0) spun up on Lake Monona around 713 pm CDT, Monday evening, August 8th. It was associated with a convective rain-shower that had moved south-southeast across the lake. There wasn't any thunder or lightning – in other words it wasn't a thunderstorm. The tornado/waterspout was seen by many people, and several individuals took pictures and/or video of it. The associated "funnel cloud" was probably in existence for a few minutes prior to the tornado spin-up (rotating air column extending from the ground or water surface to the base of a convective cloud). There were no injuries, fatalities, or damage. http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=71794&source=2





## August 19, 2011, Killer Tornado Near Wausaukee, Marinette County

A severe thunderstorm produced a tornado over Marinette County near Wausaukee late in the afternoon on August 19, 2011. The twister flattened a mobile home, killing the occupant; and another mobile home was heavily damaged. At least four other buildings sustained minor damage. Hundreds of trees were snapped or uprooted along the nearly eight mile long path of the storm. The tornado was rated EF1 with maximum winds estimated at 100 to 105 mph.




http://www.crh.noaa.gov/grb/?n=110819_tornado

## August 23, 2011, Severe Storms & EF2 Tornado in West-central Wisconsin

Scattered severe thunderstorms moved across the central part of Wisconsin on August 23rd. The storms initially produced large hail, some of which were the size of golf balls near Thorp in the northwestern section of Clark County. As the storms continued to move southeast, a tornado formed 7 miles northwest of Chili. This EF2 tornado traveled approximately 7.2 miles east-southeastward. It had winds estimated at between 120 and 130 mph. The tornado knocked a house off its foundation, blew roofs off houses, destroyed or damaged barns and trees, and power lines were blown down. In addition, two people suffered minor injuries.


http://www.crh.noaa.gov/arx/?n=aug2311

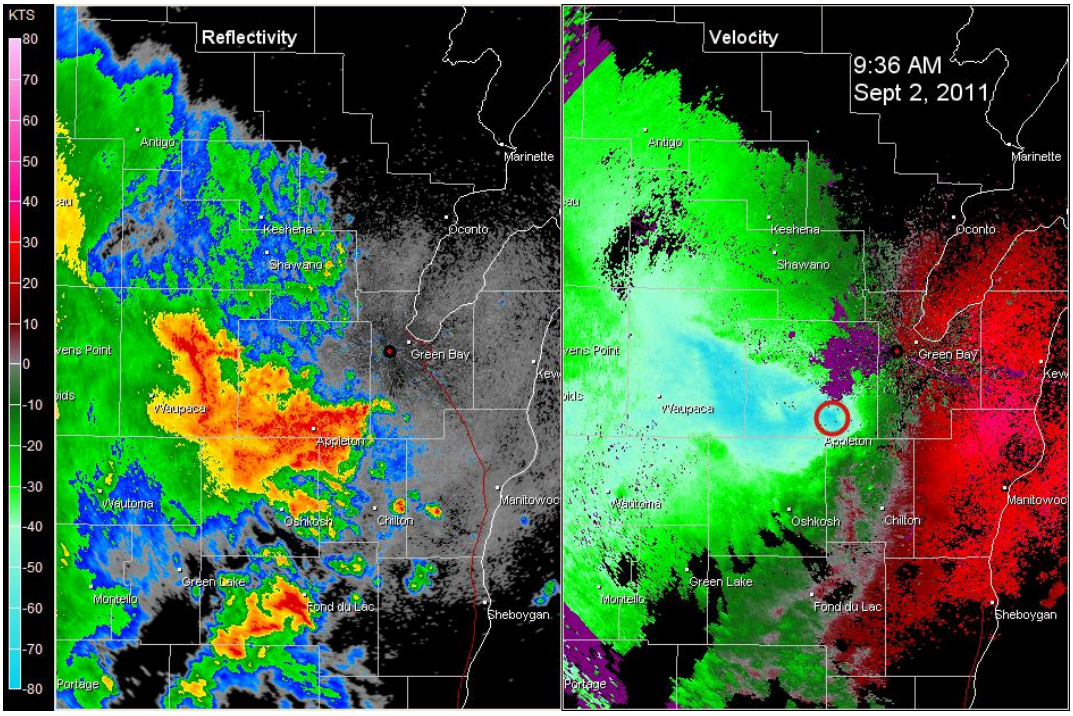
## September 2, 2011, Severe Thunderstorms West-central through Northeast Wisconsin

During the early morning hours, after a very warm and humid overnight, a complex of thunderstorms strengthened over northern Iowa. The somewhat "short" line of thunderstorms began to produce damaging winds near Mason City, Iowa around 540 am and those reports continued through La Crosse, Wisconsin (730 am) and into central Wisconsin (830 am). The thunderstorm complex produced a swath of wind damage all the way across Wisconsin into the Green Bay area.

Wind gusts up to 60 to 70 mph were noted across west-central Wisconsin. Most of the wind damage was to trees with collateral damage to power lines, homes, and cars. No reports of injuries were received from west-central Wisconsin, but many people were without power. The storms intensified as they moved to the Fox River Valley. Gust increased to at least 70 to 80 mph. Thousands of trees and power lines were blown down by the thunderstorm cluster in the Fox River Valley. Numerous buildings were also damaged by fallen trees and the high winds. Power was knocked out to over 60,000 people at the height of the storm. Many thousands were still without power 12 hours after the event. Below is a plot of some of the max wind gusts.


http://www.crh.noaa.gov/arx/?n=sep0211
http://www.crh.noaa.gov/grb/?n=110902_downburst

The Appleton area was hit the hardest - with isolated winds estimated at around 95 mph. Damage in the Appleton area alone was $5.3 million." Below is a radar image at 9:36 AM near the time of strongest winds in the Appleton area. Doppler radar measured winds over 80 mph several hundred feet above the ground near Appleton (circled area on "Velocity" image below).




## September 5, 2011, Very Cool Labor Day Monday

Below normal temperatures affected all of Wisconsin on Labor Day. The morning lows ranged from the mid-30s over the northern counties to around 50 over the southeast corner. Daytime maximum readings ranged from the mid-50s over the northern counties to around 70 near the Mississippi River. The lowest reading was 34 at Hayward. The morning of Tuesday September 6th was a few degrees cooler over much of the state and the lowest reading was 30 degrees at the Land O Lakes Airport. Much of the state would experience below normal temperatures through September 8th or 9th. Thereafter, through October and much of November, much of Wisconsin experienced above normal temperatures and below normal precipitation.

## September 24, 2011, Waterspouts East of the Milwaukee Harbor

Five waterspouts were observed and photographed east of the Milwaukee Harbor between 945 am and 1045 am CDT on September 24th. They were associated with a cluster of convective rain showers and a weak frontal boundary. Movement of the waterspouts was roughly northwest and they managed to stay offshore. No damage was reported. Two or three of them occurred at the same time. Additional waterspouts were reported on the 24th between Milwaukee and Chicago – perhaps for a total of 20 or more!

## October 19, 2011, High Winds Lake Michigan Shoreline Sheboygan to Kenosha

Strong low pressure over Ohio resulted in gusty northeast winds of 40 to 70 mph along the Lake Michigan shoreline from the Sheboygan area south. Waves built to 12 to 16 feet which led to boat damage at the South Shore yacht Club. At this location 3 boats were destroyed and 4 others damaged. One person was also injured while trying to secure ropes attached to a boat. A peak gust of 72 mph was recorded on the lakeshore at Racine.
https://nwschat.weather.gov/p.php?pid=201110200330-KMKX-NOUS43-PNSMKX

## November 9, 2011, Early-Season Winter Storm Southwest Through Northeast Wisconsin

An early-season snow event affected a broad swath of Wisconsin from around Prairie du Chien northeast through the Wautoma area to the Crandon and Long Lake area. The snow was heavy and wet, with accumulations ranging from 4 to around 9 inches. Long Lake 3NE in Florence County had the greatest snow amount. What made this event interesting was that many municipal and county highway departments didn't initially have enough snow plows attached to trucks. Many trucks were still being used to dispose of tree leaves and twigs raked from yards. This event was the first of the season in Wisconsin with at least 6 inches, and it occurred 5 days earlier than the average date of November 14th. Power outages were reported in Oneida, Marathon, Langlade, Waupaca and Shawano counties as the wet snow caused tree limbs to break.. At the height of the storm, over 15,000 customers were without power. Hundreds of vehicle accidents occurred across the area.
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=75056&source=2
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=grb&storyid=75084&source=2
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=arx&storyid=75072&source=2

# Additional Statewide Numbers and Facts

## General Thoughts

It was another year of extremes. Considering the number of weather events the number of weather-related fatalities and injuries was low. The 2010-11 winter-season featured above normal snowfall with a record-setting blizzard on Groundhog Day, while the summer-season featured a statewide, 4-day heat wave which resulted in 5 fatalities.

The tornado season was above normal with the 38 documented tornadoes making the year the 3rd busiest on record. Fifteen occurred on April 10th and eleven spun up on May 22nd. Waterspouts were observed on September 24th on Lake Michigan, and a tornado-waterspout spun up on Lake Monona in Madison!

Western Waukesha County experienced a 100+ mph thunderstorm downburst event which leveled or damaged thousands of trees. Extreme thunderstorm wind events of this nature are not common in Wisconsin and occur about once every 2.5 years.

Although scattered locations did experience low-end flash flooding, widespread flooding events didn't occur as they did in previous years. One flood fatality occurred in Racine County during isolated flooding of a frontage road on I-94.

The fall season and first part of the 2011-2012 winter season featured above normal temperatures and below normal precipitation and snowfall. However, an early season winter storm with 4 to 9 inches of snow affected parts of the state on November 9th.

## Wisconsin Weather-Related Fatalities and Injuries in 2011

A total of ten people were directly killed by weather events, and at least 124 injured. Excessive heat was the biggest killer. At least 108 people received medical treatment for the effects of heat – and these were labeled as injuries. This occurred during the July 17-21st heat wave. The table below gives the breakdown.

| | Fatalities | Injuries |
|---|---|---|
| **Blizzard** | 1 | 0 |
| **Excessive Heat** | 5 | 108 |
| **Lightning** | 1 | 0 |
| **Tornado** | 1 | 6 |
| **Thunderstorm Wind** | 1 | 10 |
| **Flood** | 1 | 0 |
| **Total** | **10** | **124** |

Corrected injuries due to Tornado and Thunderstorm Winds

## Property and Crop Losses

Total property and crop losses reported came to roughly $104 Million. This number is most likely an underestimate. Below is a table showing the breakdown.

| | |
|---|---|
| Tornado Property | $50,963,000 |
| Tornado Crop | $91,000 |
| Thunderstorm Wind Property | $9,855,000 |
| Thunderstorm Wind Crop | $4,461,000 |
| Hail Property | $33.961,000 |
| Hail Crop | Unknown |
| Lightning | $2,398,000 |
| Heat* | $76,000 |
| Flood/Flash Flood Property | $479,000 |
| Non-Tstm Strong/High Wind | $542,000 |
| Winter Storm Property** | $304,000 |
| **Total** | **$103,610,000** |

'* Minor road damage due to the July 17-21st heat wave. This amount is likely an underestimate.

** Train and building damage in March 22-23rd Winter Storm. Damage probably occurred during the February 1-2nd Groundhog Blizzard and other winter storms, but loss estimates are not available. Vehicle damage due to accidents on icy or slippery roads was not available.

## State Temperature Extremes

Coldest was -37 degrees (F) at Ladysmith 3SW (Rusk Co.) on January 22nd.
Warmest was 103 at Ft. Atkinson on July 20th.

## Tornadoes

In 2011, 38 tornadoes were documented. The 1981-2010 average is 23 per year. This places 2011's total in a tie for 3rd place with 2008. The year with the most documented tornadoes in Wisconsin is 2005 with 62.

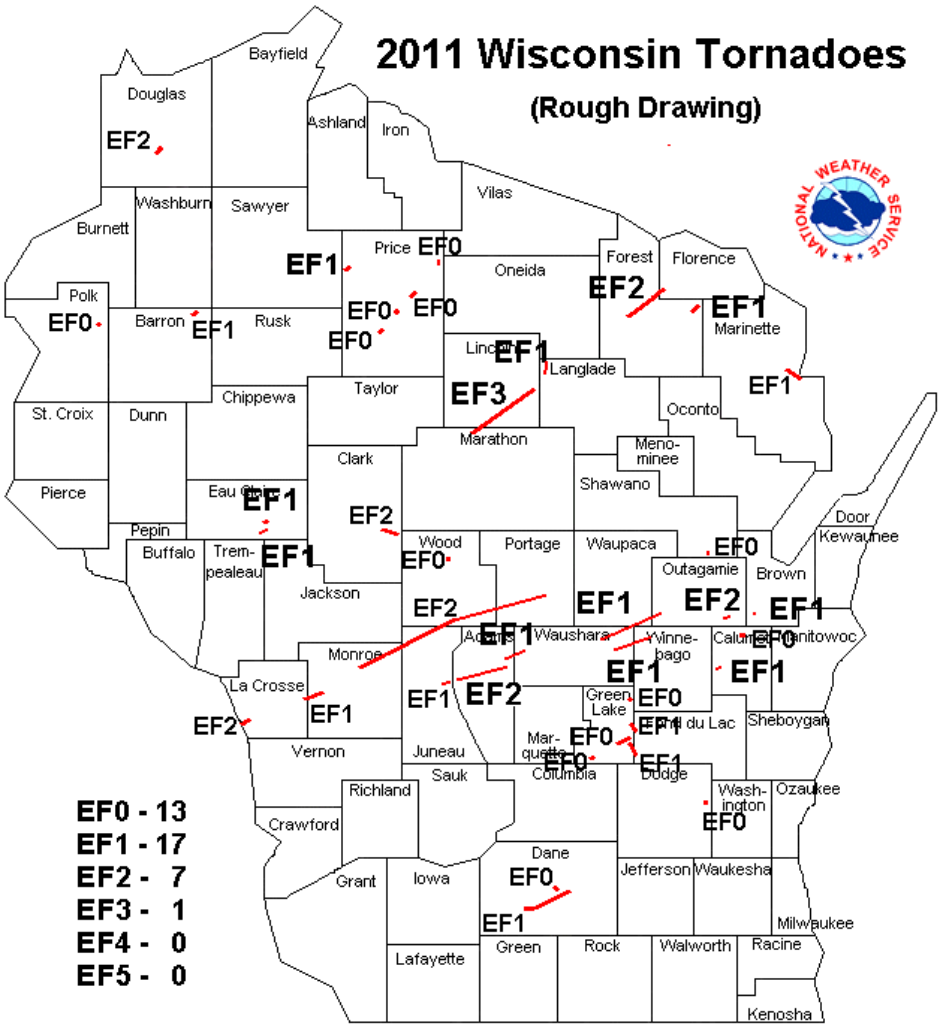
Eight of the tornadoes were rated as strong (EF2 or EF3), and the remaining 30 were rated as weak (EF0 or EF1). The strongest tornado, rated EF3, affected the Merrill area in Lincoln County on April 10th.

There was only 1 directly-related death attributed to tornadoes – in Marinette County (see August 19th story). All-together, five people were directly injured by tornadoes in 2011.
Green Lake and Price Counties both had 5 tornado visits.

A May 22nd tornado had a 64.5 mile track from Monroe through Juneau and Wood Counties into Portage County. There was only one injury with this tornado which was the 17th longest-tracked tornado in Wisconsin's recorded history.

All of the tornadoes resulted in property losses of roughly $51 Million.

For additional details, refer to this story:
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=69471&source=0




## Length of Growing Season (Temperatures above 32 F)

Shortest was in northwest Wisconsin – from May 27th through Sep 4th (101 days).
Longest was along Kenosha lakeshore – from Apr 20th through Nov 4th (199 days).

Summary generated by Rusty Kapela, WCM, WFO Milwaukee, with input from other WCMs: Jeff Last, WFO Green Bay, Todd Shea, WFO La Crosse, Todd Krause, WFO Minneapolis, Carol Christenson, Duluth. Additional input was received from Ed Hopkins, PhD, Assistant State Climatologist.